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CASE REPORT

Erythema Gyratum Repens an Immunological Paraneoplastic Dermatosis

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The authors present a patient with erythema gyratum repens who had a bronchogenic carcinoma. Autoantibodies and complement at the basement membrane zone of the skin was found which suggest that erythema gyratum repens may have an immunological pathogenesis but the nature of the antigen should be further characterised. (Pathology Oncology Research Vol 3, No 1, 59–61, 1997)

Key words: Erythema gyratum repens, Paraneoplastic dermatosis, Immunfluorescence

Introduction

Erythema gyratum repens (EGR) is one of the most specific dermatoses associated with neoplasia.[1] The disease was first reported in 1952 by Gammel, who described a patient with breast carcinoma associated with a bizarre gyrate erythema that improved rapidly following radical mastectomy.[2] Since then, a total of 50 patients with EGR have been reported in the dermatological literature.

Erythema gyratum repens is a figurate erythema consisting of serpiginosus erythematous bands with a prominent scaling edge which slowly migrates (about 1 cm every day) over the skin surface in waves (repens from the Latin meaning to crawl). The rash often resembles the grain of wood because of its tendency to form concentric rings.

With rare exceptions, the vast majority of patients with EGR have an associated malignancy (84%). Bronchial cancer is most commonly reported, followed by oesophageal, tongue, hypopharyngeal, breast and uterine cancer.[5] In 60-80 % of cases the skin eruption develops before symptoms of the occult tumor highlight this as a marker of serious systemic disease. In the remaining cases (40%) the eruption occurred either concurrently or after the diagnosis of the neoplasia had been made. Suceessful treatment of the underlying malignancy generally produced an improvement or resolution of the eruption. In patients with widespread metastases, the eruption may persist or recur. In several patients, regression has occurred shortly before death and was thought to be a manifestation of immunologic incompetence. Only a small number of patients with erythema gyratum repens have nonneoplastic conditions as tuberculosis and CREST syndroma.[3,4]

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Case Report

A 60-year-old white man who was a retired fireman was admitted to the Department of Dermatology, Szolnok in October 1995 with a 2-week history of a scaly pruritic eruption. His past medical history was not significant. He had a 365-pack-year history of cigarette smoking for the last 40 years.

Physical examination disclosed a generalised eruption characterised by whirled, irregular, multiple, gyrate bands of erythema surrounded on one side by a scale and on the other by normal-looking skin localised on the trunk and extremities sparing the face. The waves of advancing borders gave the appearance of a wood grain pattern that was most pronounced in the skin surrounding the intertriginous areas (*Fig.1*). The eruption slowly migrated (about 1 cm per day) and new rings of erythema appeared within those already existing. He also had diffuse hyperkeratosis of the palms and soles and the nails were thickened.

Figure 1. The generalized eruption characterized by whorled, irregular, multiple, gyrate bands of erythema surrounded on one side by a scale and on the other side by normal-looking skin was most pronounced in the skin surrounding the intertriginous areas.

The remainder of the physical examination was normal.

Laboratory studies including a complete and differential blood count, platelet count, electrolytes, liver function tests; serum protein electrophoresis, immunoelectrophoresis, autoantibodies were all within normal limits. Direct and indirect Coombs tests were negative. Histology of a skin biopsy specimen showed hyperkeratosis, acanthosis, focal hypergranulation and a moderate perivascular lymphohistiocytic infiltrate in the dermis. Direct immunofluorescence (DIF) of involved non-sun-exposed and uninvolved skin showed coarse granular deposits of IgG (*Fig.2*) and C3 at the basement membrane zone. Indirect immunofluorescence (IIF) was negative on normal human skin.

The clinical findings were consistent with ERG and a search for an associated neoplasm was performed.

Chest X-ray, gastroscopy, colonoscopy, irrigoscopy, ultrasound and computerised tomography of the abdomen and pelvis were normal. On computerised tomography of the chest a peribronchial mass was found connected with two cavities in the area of the 9th segments of the left upper lobe in November 1995. Adenopathy was present in the hilar and mediastinal regions. The patient underwent bronchoscopy and mediastinoscopy. Pathology of the tumor and hilar, mediastinal lymph nodes showed a metastatic squamous cell carcinoma of the lung.

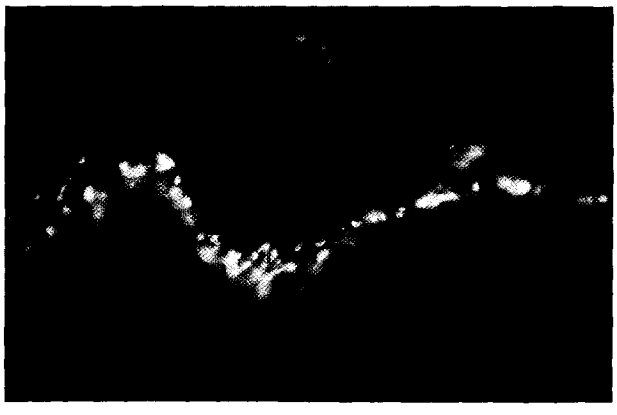

Figure 2. Direct immunofluorescence of involved non-sun-exposed and uninvolved skin showed coarse granular deposits of IgG at the basement membrane zone.

Thoracotomy showed expansion of the tumor to the left ventricle of the hearts through the pericardium and metastatic lymph nodes in all the examined regions. Because the neoplasm was not localized in the chest, the surgery was restricted to an explorative laparatomy. The patient received combined chemotherapy (800 mg Cytoxan, 50 mg Methotrexat, 50 mg Pharmarubicin). After the third cytostatic treatment a significant regression of the pulmonary process and skin eruptions were observed. The skin was treated with topical hydrocortison butyrate 2,5% cream and with topical hydrophyl ointment containing 10% urea.

Following the temporary improvement the eruption became more extensive, so that it became generalised and converted to an exfoliative dermatitis with paresthesia of the extremities and dysphonia which were the signs of polyneuropathia paraneoplastica together with a rapid progression of the lung tumor.

Discussion

The consistent association of erythema gyratum repens with malignancy in almost all reported cases, and the improvement frequently seen following treatment of the underlying neoplasia; suggest an etiologic relationship between the two disorders.

The results of immunological examinations in the past years suggest that erythema gyratum repens may have an immunological pathogenesis. DIF tests on the skin describe deposits of IgG and C3 along the basement membrane zone (BMZ), and IIF revealed circulating anti-BMZ antibodies in some cases.[6] Direct immunoelectron microscopy demonstrated that immune deposits are localized in the upper part of the dermis, just beneath the lamina densa. DIF on the lung tumor tissue did not show any deposits on neoplastic cells, but there were granular deposits of IgG, IgM and C3 at the basement membrane of the bronchial epithelium in one study.[6]

The nature of the antigen is not clear but it is supposed that keratinized cells have proteins which share similar epitopes with the tumor or its proteins, which gives an explanation of the existence of cross-reaction. This theory suggests that the tumor produces molecules which alter components of the pulmonary basement membrane with a subsequent induction of antibodies and their local deposition.[6,8] Alternatively, tumor products might be selectively deposited at the skin.[9]

The mechanism of migration of the lesions in erythema gyratum repens is unclear. In lesional skin and lung of erythema gyratum repens there is a modification of the phenotype of fibroblast to myofibroblast. Increased staining for cytoskeleton proteins i.e. smooth muscle cell -actin and vimentin in skin and lung correspond to modifications of the phenotype of fibroblast. The myofibroblast phenotype occurs during wound repair, and in stromal cells in cancer. The mechanism which induces this modified phenotype is not clear.[6]

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